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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
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| 10/825,801 | 04/01/2004 | Gerald W. Iseler | AFB00698 | 9089 |

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DEPARTMENT OF THE AIR FORCE
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BLdg 11, Room D18
WRIGHT-PATTERSON AFB, OH 45433-7109

| EXAMINER | |
|---|---|
| SONG, MATTHEW J | |

| ART UNIT | PAPER NUMBER |
|---|---|
| 1792 | |

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| 07/25/2008 | PAPER |

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

| Office Action Summary | Application No. | Applicant(s) | |
|---|---|---|---|
| | 10/825,801 | ISELER ET AL. | |
| | Examiner | Art Unit | |
| | MATTHEW J. SONG | 1792 | |

*-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --*

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

1)☒ Responsive to communication(s) filed on *07 April 2008*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

4)☒ Claim(s) *11-15* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *11-13* is/are rejected.

7)☒ Claim(s) *14 and 15* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

**Application Papers**

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

## DETAILED ACTION

### *Claim Rejections - 35 USC § 103*

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

2. Claims 11-13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tomzig et al (US 6,001,170) in view of Linares (US 3,899,304).

In an apparatus for crystal growth, note entire reference, Tomzig et al teaches a melt is held in a crucible comprising a graphite crucible (col 1, ln 10-30); a seed crystal is immersed in the melt and drawn away (col 1, ln 10-30), this clearly suggests a means for installing a seed crystal and charge in the vessel; a heater means **4** to heat the charge (col 5, ln 60 to col 6, ln 15); and a magnetic system comprising an induction coil mounted around the vessel (col 3, ln 45-65; col 6, ln 1-45). Tomzig et al also teaches the magnetic system is connected to an AC/DC

converting unit and fed via a power supply (col 6, ln 1-40), this clearly suggests applicant's means for applying a voltage to impose magnetic field lines.

Tomzig et al does not teach an inner elongated electrode and an outer electrode of graphite and a means for applying a voltage across the electrodes.

In an apparatus for crystal growth, note entire reference, Linares teaches an electrode **20** may be inserted into a melt and is electrically connected as an anode (col 4, ln 15-40), this clearly suggests applicant's small elongated electrode material which extends into a melt but does not contact a crystal. Linares also teaches a molten support material made of graphite is electrically connected as a cathode (col 2, ln 40-60; col 4, ln 15-40). Linares also teaches applying a voltage between the cathode and anode to suppress impurity incorporation into the melt (col 4, ln 30-65).

It would have been obvious to a person of ordinary skill in the art at the time of the invention to modify Tomzig et al by incorporating an anode and cathode electrodes, as taught by Linares, to suppress impurity incorporation into a melt used for crystal growth.

The combination of Tomzig et al and Linares does not teach the intended use of the means for applying voltage across the electrode, however a recitation of the intended use of the claimed invention must result in a structural difference between the claimed invention and the prior art in order to patentably distinguish the claimed invention from the prior art. If the prior art structure is capable of performing the intended use, then it meets the claim. Here, the combination of Tomzig et al and Linares teaches the electrodes and a voltage means, thus is capable of the intended use of providing a radial electric current.

The combination of Tomzig et al and Linares does not teach the intended use of the means for applying voltage to impose magnetic field lines in the melt such that the flow of the radial current crosses the magnetic field lines to impart a stirring force, however a recitation of the intended use of the claimed invention must result in a structural difference between the claimed invention and the prior art in order to patentably distinguish the claimed invention from the prior art. If the prior art structure is capable of performing the intended use, then it meets the claim. Here, the combination of Tomzig et al and Linares teaches an induction coil for applying a magnetic field and a voltage means, thus is capable of the intended use of providing magnetic field lines that cross radial electric current to impart a stirring force.

In regards to the vessel being configured to hold a seed crystal below a melt, the combination of Tomzig et al and Linares teaches a crucible and a crystal seed may be provided for contact with a melt adjacent to the bottom of the melt or on the boat ('304 col 3, ln 15-25), this clearly suggest that the crucible is capable of holding a seed below the melt.

Referring to claim 12, the combination of Tomzig et al and Linares teaches the crucible serves as the electrode.

Referring to claim 13, the combination of Tomzig et al and Linares teaches an induction coil, which is capable of the intended use of heating.

### *Allowable Subject Matter*

3. Claims 14-15 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

***Response to Arguments***

4. Applicant's arguments with respect to claims 11-13 have been considered but are moot in view of the new ground(s) of rejection.

5. Applicant's arguments filed 4/7/2008 have been fully considered but they are not persuasive.

Applicant's argument that Linears teaches a vertical electrode **20** and a connector **18** would provide a vertical electrical field, not a radial electrical field is noted but not found persuasive. Linears does not teach a vertical electrical field as alleged by applicant. Linears is silent to the direction of the electric, thus does not teach a vertical field. Linears does teach that an electrode may be inserted into the melt as an anode, and connecting a graphite boat as a cathode (col 4, ln 15-31 and col 2, ln 40-46). The boat taught Linears is at least partially around the inner electrode (See Fig 1). Therefore, the apparatus taught by the combination of Tomzig et al and Linares is capable of generating a radial electric current in the melt because applicant teaches a radial electrical field is generated between an electrode which extends into a melt and an outer electrode of graphite which extends at least partially around the inner electrode, which is similar to the apparatus taught by the combination of Tomzig et al and Linares. Applicant alleges that the electric field would occur between the electrode and the connector, however the electric field would occur between the electrodes, i.e. the crucible and the inner electrode.

Applicant's argument that the limitation in paragraph (h) of claim 11 is the equivalent to a structural feature and not a mere intended use is noted but not found persuasive. The "means for" claimed is merely a means for applying a voltage between an inner and outer electrode, and the

prior art teaches the structural elements, i.e. an inner electrode, outer electrode and means for applying a voltage; therefore all of the structural limitations are taught and the apparatus taught by the prior art would be capable of the intended use of stirring.

***Conclusion***

6. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

7. Any inquiry concerning this communication or earlier communications from the examiner should be directed to MATTHEW J. SONG whose telephone number is (571)272-1468. The examiner can normally be reached on M-F 9:00-5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Michael Kornakov can be reached on 571-272-1303. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Matthew J Song
Examiner
Art Unit 1792

MJS
July 19, 2008

/Robert M Kunemund/

Primary Examiner, Art Unit 1792